

18

# SEARCH REQUEST FORM

Scientific and Technical Information Center

Requester's Full Name: JOHN MAPLES Examiner #: 62294 Date: 11/18/03  
Art Unit: 1745 Phone Number 30 8-1795 Serial Number: 09/718,148  
Mail Box and Bldg/Room Location: CPA23-8E12 Results Format Preferred (circle): PAPER DISK E-MAIL

If more than one search is submitted, please prioritize searches in order of need.

\*\*\*\*\*

Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc, if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

Title of Invention: FUEL CELL <sup>SYSTEM</sup> WITH ACTIVE METHANOL CONCENTRATION CONTROL  
Inventors (please provide full names): WILLIAM ACKER, GEORGE MCNAMEE,  
WILLIAM DALEY

Earliest Priority Filing Date: \_\_\_\_\_

*\*For Sequence Searches Only\* Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.*

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Online Time: _____	Other _____	Other (specify) _____

=> file caplus

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FILE LAST UPDATED: 17 Nov 2003 (20031117/ED)

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=> file wpix

FILE 'WPIX' ENTERED AT 16:16:40 ON 18 NOV 2003

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FILE LAST UPDATED: 17 NOV 2003 <20031117/UP>

MOST RECENT DERWENT UPDATE: 200374 <200374/DW>

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<20031117/UP>

FILE COVERS 1970 TO DATE.

<<< SIMULTANEOUS LEFT AND RIGHT TRUNCATION AVAILABLE IN  
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=> file jicst

FILE 'JICST-EPLUS' ENTERED AT 16:16:54 ON 18 NOV 2003

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FILE COVERS 1985 TO 17 NOV 2003 (20031117/ED)

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TERM (/CT) THESAURUS RELOAD.

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L1	40061	SEA	FILE=CAPLUS	ABB=ON	PLU=ON	FUEL CELL		
L2	328	SEA	FILE=CAPLUS	ABB=ON	PLU=ON	METHANOL? (L) REGULATION?		
L3	13	SEA	FILE=CAPLUS	ABB=ON	PLU=ON	L1 AND L2		
L4	2961	SEA	FILE=CAPLUS	ABB=ON	PLU=ON	METHANOL? (L) FUEL CELL?		
L5	4	SEA	FILE=CAPLUS	ABB=ON	PLU=ON	L4 AND METHANOL (5A) REGULATION?		
L6	4	SEA	FILE=CAPLUS	ABB=ON	PLU=ON	L4 AND METHANOL? (5A) REGULATION?		
L9	2263	SEA	FILE=CAPLUS	ABB=ON	PLU=ON	METHANOL (4A) FUEL (5A) CELL		
L10	136	SEA	FILE=CAPLUS	ABB=ON	PLU=ON	(L3 OR (L5 OR L6) OR L9 OR L4) AND (SENSOR OR DETECT? OR REGULAT?)		
L11	4	SEA	FILE=CAPLUS	ABB=ON	PLU=ON	(L3 OR (L5 OR L6) OR L9 OR L4) AND SIGNAL AND (SENSOR OR DETECT? OR REGULAT?)		
L12	136	SEA	FILE=CAPLUS	ABB=ON	PLU=ON	L10 OR L11		
L16	19	SEA	FILE=CAPLUS	ABB=ON	PLU=ON	L12 AND METHANOL? (5A) CONCENTRAT ?		
L17	18	SEA	FILE=WPIX	ABB=ON	PLU=ON	L12 AND METHANOL? (5A) CONCENTRAT?		
L18	2	SEA	FILE=COMPENDEX	ABB=ON	PLU=ON	L12 AND METHANOL? (5A) CONCENT RAT?		
L19	1	SEA	FILE=JICST-EPLUS	ABB=ON	PLU=ON	L12 AND METHANOL? (5A) CONCE NTRAT?		
L20	34	DUP	REM	L16	L17	L18	L19	(6 DUPLICATES REMOVED)

=> d ti 1-34

YOU HAVE REQUESTED DATA FROM FILE 'CAPLUS, WPIX, COMPENDEX, JICST-EPLUS' -  
CONTINUE? (Y)/N:y

- L20 ANSWER 1 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN DUPLICATE 1  
TI Infrared sensing of **concentration of methanol's**  
aqueous solution for a direct **methanol fuel**  
**cell**
- L20 ANSWER 2 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN DUPLICATE 2  
TI Method for determining the concentration of a fluid solution and its  
application to direct **methanol fuel cell**
- L20 ANSWER 3 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN  
TI Method of measuring **methanol concentration** in an  
aqueous solution
- L20 ANSWER 4 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN  
TI Ultrasound sensing of **concentration of methanol's**  
aqueous solution in direct **methanol fuel cell**
- L20 ANSWER 5 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN  
TI Indirect measurement of fuel concentration in a liquid feed fuel cell
- L20 ANSWER 6 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN  
TI Gas **sensor**, for e.g. for measuring concentration of hydrogen gas  
in fuel gas for use in fuel cell, comprises proton conduction layer, first  
and second electrodes, reference electrode and diffusion controlling  
portion.
- L20 ANSWER 7 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN  
TI Process for **regulating the methanol**  
**concentration of a direct methanol fuel**  
**cell** system comprises varying a first system parameter, and  
introducing **methanol** from a **methanol** reservoir  
depending on the resulting voltage from the fuel solution.
- L20 ANSWER 8 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN  
TI Reliable and fast-responding **methanol concentration**  
**sensor** with novel design
- L20 ANSWER 9 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN  
TI Study on the methanol permeability in polyacrylamide solid gel membranes
- L20 ANSWER 10 OF 34 COMPENDEX COPYRIGHT 2003 EEI on STN  
TI Reliable and fast-responding **methanol concentration**  
**sensor** with novel design.
- L20 ANSWER 11 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN DUPLICATE 3  
TI Apparatus and methods for **sensor-less** optimization of  
**methanol concentration** in a direct **methanol**  
**fuel cell** system
- L20 ANSWER 12 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN DUPLICATE 4

- TI **Regulation** of the fuel concentration in the anode fluid of a direct **methanol fuel cell** by determination of carbon dioxide in the exhaust gas of the cathode
- L20 ANSWER 13 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN
- TI A **methanol sensor** operated in a driven mode for **fuel cell** use
- L20 ANSWER 14 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN
- TI Method for fabrication of direct **methanol fuel cell** system
- L20 ANSWER 15 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN
- TI Apparatus and methods for **sensor-less** optimization of **methanol concentration** in a direct **methanol fuel cell** system
- L20 ANSWER 16 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN
- TI Direct **methanol fuel cell** system including an integrated **methanol sensor** and method of fabrication
- L20 ANSWER 17 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
- TI Direct **methanol fuel cell** system for portable electronic devices, has multiple electrical components in base portion for electrical integration of **fuel cell** assembly with **methanol concentration sensor**.
- L20 ANSWER 18 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
- TI **Methanol concentration sensor**, for use with fuel supply, comprises membrane electrode, anode and cathode current collector, and current **sensor** to measure current to provide **signal**.
- L20 ANSWER 19 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
- TI **Fuel cell** system e.g. direct **methanol fuel cell** system increases **fuel concentration** at anode and increases oxidation of crossover fuel at cathode when **regulator** temperature is below specified range.
- L20 ANSWER 20 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
- TI Generation of hydrogen used as **fuel**, involves electro-oxidizing **methanol** at anode in electrolytic cell to form protons and electro-reducing protons at cathode to form hydrogen.
- L20 ANSWER 21 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
- TI Fuel supply device and method in fuel cell.
- L20 ANSWER 22 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
- TI Fuel supply device in fuel cell.
- L20 ANSWER 23 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN

TI Fuel supply device in fuel cell.

L20 ANSWER 24 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

TI **Fuel cell (methanol) sensor** with small load resistance and high oxidant supply

L20 ANSWER 25 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN

TI Determining fuel concentration in electrolyte of fuel cell comprises measuring capacity of capacitor, calculating dielectric constant and determining fuel concentration.

L20 ANSWER 26 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

TI Plasma polymerized barrier films on membranes for direct **methanol fuel cells**

L20 ANSWER 27 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN DUPLICATE 5

TI Design and operation of an electrochemical **methanol concentration sensor** for direct **methanol fuel cell** systems

L20 ANSWER 28 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN DUPLICATE 6

TI **Methanol concentration sensor** for aqueous environments such as liquid direct-feed **fuel cells**.

L20 ANSWER 29 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN

TI New perovskite-type solid electrolyte - has alkaline earth metal sites occupied by barium and rare earth metal sites occupied by praseodymium and another rare earth metal.

L20 ANSWER 30 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

TI Manufacture of noble metal catalysts, apparatus for reducing carbon monoxide **concentration**, apparatus for reducing **methanol concentration**, and fuel reformers

L20 ANSWER 31 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN

TI **Fuel cell** system - has reforming device to reform **methanol** to **fuel** gas containing hydrogen and **fuel cell** to obtain electromotive force by electrochemical reaction of **fuel** gas.

L20 ANSWER 32 OF 34 JICST-EPlus COPYRIGHT 2003 JST on STN

TI Study on fuel supplying method and **methanol concentration sensor** for the high efficient operation of **methanol fuel cells**.

L20 ANSWER 33 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN

TI Fuel concentration control method - and electrode material for recirculating **methanol-air fuel cell**.

L20 ANSWER 34 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

TI Fuel concentration **sensors** for fuel cells

=> d all 1-34 120

YOU HAVE REQUESTED DATA FROM FILE 'CAPLUS, WPIX, COMPENDEX, JICST-EPLUS' -  
CONTINUE? (Y)/N:y

L20 ANSWER 1 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN DUPLICATE 1

AN 2003:511904 CAPLUS

DN 139:55555

TI Infrared sensing of **concentration** of **methanol's**  
aqueous solution for a direct **methanol fuel**  
**cell**

IN Rabinovich, Arnold; Diatzikis, Evangelos; Mullen, Jeffrey; Tulimieri,  
Daryl

PA USA

SO U.S. Pat. Appl. Publ., 14 pp.

CODEN: USXXCO

DT Patent

LA English

IC ICM H01M008-00

ICS G01N021-84

NCL 429013000; 073061480

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 80

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2003124398	A1	20030703	US 2001-33709	20011228
	WO 2003058737	A1	20030717	WO 2002-US41626	20021227
	W:				
	AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN,				
	CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,				
	GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR,				
	LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH,				
	PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ,				
	UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD,				
	RU, TJ, TM				
	RW:				
	GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, BG,				
	CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL,				
	PT, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML,				
	MR, NE, SN, TD, TG				

PRAI US 2001-33709 A 20011228

AB Systems and methods for IR sensing a compound's concentration in aqueous  
solution are

provided. In various non-limiting embodiments, the invention provides IR  
sensing of **methanol's concentration** in aqueous solution in  
connection with a fuel circulation process for a direct **methanol**  
**fuel cell**. In some embodiments, flow-through IR sensing  
technique are provided. In other embodiments, window type IR sensing  
techniques are provided. As a result of the IR sensing, an accurate  
real-time measurement of the concentration of a compound of interest in  
aqueous solution

is affordably obtained.

ST fuel cell direct methanol IR sensing  
concn methanol aq

IT Flow  
(IR sensing of concentration of methanol's aqueous solution for  
direct methanol fuel cell)

IT Optical detectors  
(IR; IR sensing of concentration of methanol's aqueous solution  
for direct methanol fuel cell)

IT Fuel cells  
(direct methanol; IR sensing of concentration of  
methanol's aqueous solution for direct methanol fuel  
cell)

IT IR radiation  
(transmission; IR sensing of concentration of methanol's  
aqueous solution for direct methanol fuel cell)

IT 67-56-1, Methanol, uses  
RL: ANI (Analyte); TEM (Technical or engineered material use); ANST  
(Analytical study); USES (Uses)  
(IR sensing of concentration of methanol's aqueous solution for  
direct methanol fuel cell)

L20 ANSWER 2 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN DUPLICATE 2  
AN 2003:259802 CAPLUS  
DN 138:274069

TI Method for determining the concentration of a fluid solution and its  
application to direct methanol fuel cell

IN Ohler, Christian; Killer, Eric; Unternaehrer, Peter

PA ABB Research Ltd., Switz.; E.I. Du Pont De Nemours and Company

SO Eur. Pat. Appl., 8 pp.

CODEN: EPXXDW

DT Patent

LA German

IC ICM G01N009-36

ICS H01M008-04

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 80

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 1298427	A1	20030402	EP 2001-810942	20010927
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR				
PRAI EP 2001-810942		20010927		
AB The invention concerns a process to determine the concentration of a solution of a solid or a liquid in a solvent, whose d. is different from that of the solid or the liquid In the solution N substances were dipped, where $N \geq 1$ , and each substance ( $K_n$ ) has a d. ( $\rho_n$ ) which corresponds to the d. of the solution at a definite combination of temperature and concentration From the position of $\geq 1$ substance, the concentration of the dissolved substance in the solution is				



obtained. The position of  $\geq 1$  substance is **detected** by using a **sensor**. The method is suitable especially for simple and reliable control of **methanol** content in a direct **methanol fuel cell**.

ST **fuel cell direct methanol fluid**  
**concn detn method**

IT Density  
**Fuel cells**

(method for determining concentration of fluid solution and its application to direct

**methanol fuel cell**)

IT 67-56-1, **Methanol**, uses

RL: ANT (Analyte); TEM (Technical or engineered material use); ANST (Analytical study); USES (Uses)

(method for determining **concentration** of fluid solution and its application to direct **methanol fuel cell**)

RE.CNT 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

- (1) Anon; PATENT ABSTRACTS OF JAPAN 1988, V012(023), PP-658
- (2) Gfd Geratebau Fur Druckmaschinen; DE 3327252 A 1985
- (3) Mitsubishi Electric Corp; JP 62177431 A 1987
- (4) Ramona, T; GB 2241582 A 1991
- (5) Siemens; WO 0124297 A 2001 CAPLUS
- (6) Viola, F; US 4702109 A 1987

L20 ANSWER 3 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

AN 2003:836315 CAPLUS

DN 139:311878

TI Method of measuring **methanol concentration** in an aqueous solution

IN Xie, Tuyu; Chartouni, Daniel; Ohler, Christian  
 PA Can.

SO U.S. Pat. Appl. Publ., 14 pp.  
 CODEN: USXXCO

DT Patent

LA English

IC ICM G01N027-406

NCL 205787000; 204421000; 204426000

CC 61-3 (Water)

Section cross-reference(s): 52

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2003196913	A1	20031023	US 2002-126021	20020419
	WO 2003089918	A1	20031030	WO 2002-CA1474	20020930

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM  
 RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, CH,

CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR,  
BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

PRAI US 2002-126021 A 20020419

AB A method is disclosed for measuring the concentration of a low mol. weight alc.,

such as **methanol**, in an aqueous solution The method uses a **fuel cell sensor** that includes an anode chamber for electrochem. oxidation of the **methanol**, a cathode chamber for electrochem. reduction of oxygen; a proton conducting membrane arranged between the anode and cathode; and a voltmeter operatively connected to the anode and cathode chambers. An aqueous solution of the **methanol** is fed to the anode chamber while the **fuel cell sensor** is operated at an open circuit state, thereby allowing the **methanol** to crossover to the cathode where it is oxidized. The open circuit voltage across the anode and the cathode is measured using the voltmeter and the **concentration** of the **methanol** is determined from the open circuit voltage.

ST methanol detn aq soln

IT Polyoxyalkylenes, analysis

RL: ARU (Analytical role, unclassified); DEV (Device component use); ANST (Analytical study); USES (Uses)

(fluorine- and sulfo-containing, ionomers; **methanol** determination in aqueous solution using **fuel cell sensor**)

IT **Sensors**

(**fuel cell**; **methanol** determination in aqueous solution using **fuel cell sensor**)

IT Fluoropolymers, analysis

RL: ARU (Analytical role, unclassified); DEV (Device component use); ANST (Analytical study); USES (Uses)

(polyoxyalkylene-, sulfo-containing, ionomers; **methanol** determination in aqueous solution using **fuel cell sensor**)

IT Ionomers

RL: ARU (Analytical role, unclassified); DEV (Device component use); ANST (Analytical study); USES (Uses)

(polyoxyalkylenes, fluorine- and sulfo-containing; **methanol** determination in aqueous solution using **fuel cell sensor**)

IT **Fuel cells**

(**sensors**; **methanol** determination in aqueous solution using **fuel cell sensor**)

IT 7732-18-5, Water, analysis

RL: AMX (Analytical matrix); ANST (Analytical study)

(**methanol** determination in aqueous solution using **fuel cell sensor**)

IT 67-56-1, **Methanol**, analysis

RL: ANT (Analyte); ANST (Analytical study)

(**methanol** determination in aqueous solution using **fuel cell sensor**)

IT 12779-05-4 66796-30-3, NAFION 117

RL: ARU (Analytical role, unclassified); DEV (Device component use); ANST (Analytical study); USES (Uses)

(**methanol** determination in aqueous solution using **fuel cell sensor**)

L20 ANSWER 4 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN  
AN 2003:511664 CAPLUS  
DN 139:55553  
TI Ultrasound sensing of **concentration** of **methanol's**  
aqueous solution in direct **methanol fuel cell**  
IN Rabinovich, Arnold; Tulimieri, Daryl  
PA USA  
SO U.S. Pat. Appl. Publ., 10 pp.  
CODEN: USXXCO  
DT Patent  
LA English  
IC ICM G01N029-02  
NCL 073061450; 073061490; 073061790  
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 80  
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2003121315	A1	20030703	US 2001-33416	20011228
	WO 2003058235	A1	20030717	WO 2002-US41678	20021223
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
	RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				

PRAI US 2001-33416 A 20011228

AB Systems and methods for ultrasound sensing a compound's concentration in aqueous solution  
are provided. As a result of the ultrasound sensing, an accurate real time measurement of the concentration of the compound of interest in aqueous solution is

obtained. In various non-limiting embodiments, the invention provides ultrasound sensing of **methanol's concentration** in aqueous solution in connection with a fuel circulation process for a direct **methanol fuel cell**. Since the speed of sound in a water-methanol system increases significantly with **methanol** content, techniques for measuring characteristic sound velocities are used to give sufficient resolution for a fuel circulation process.

ST ultrasound sensing **concn methanol** direct  
**methanol fuel cell**

IT **Fuel cells**  
Piezoelectric transducers  
**Sensors**  
Sound and Ultrasound

Transducers

(ultrasound sensing of **concentration** of **methanol's** aqueous solution in direct **methanol fuel cell**)

IT 67-56-1, **Methanol**, uses

RL: ANT (Analyte); TEM (Technical or engineered material use); ANST (Analytical study); USES (Uses)

(ultrasound sensing of **concentration** of **methanol's** aqueous solution in direct **methanol fuel cell**)

L20 ANSWER 5 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

AN 2003:472784 CAPLUS

DN 139:9360

TI Indirect measurement of fuel concentration in a liquid feed fuel cell

IN Zhang, JiuJun; Colbow, Kevin M.; Wong, Alfred; Lin, Bruce

PA Can.

SO U.S. Pat. Appl. Publ., 11 pp.

CODEN: USXXCO

DT Patent

LA English

IC ICM G01N025-00

NCL 073061760

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2003110841	A1	20030619	US 2001-33758	20011219
	EP 1321995	A2	20030625	EP 2002-28188	20021219
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, SK				

PRAI US 2001-33758 A 20011219

AB In an operating liquid feed **fuel cell** system, fuel concentration in the fuel stream can be calculated as a function of the observed

current, the temperature of the fuel stream entering the **fuel cell** stack and the temperature of the **fuel cell** stack itself, thereby eliminating the need for a sep. **sensor**. Typically, **methanol** will be used as the fuel and the liquid feed **fuel cell** system will thus be a direct **methanol fuel cell** system.

ST fuel concn measurement liq feed **fuel cell**; direct **methanol fuel cell** system

IT **Fuel cells**

(direct **methanol**; indirect measurement of **fuel concentration** in liquid feed **fuel cell**)

IT Polyoxyalkylenes, uses

RL: DEV (Device component use); USES (Uses)

(fluorine- and sulfo-containing, ionomers; indirect measurement of fuel concentration in liquid feed fuel cell)

IT Fuels

(**methanol**; indirect measurement of **fuel concentration** in liquid feed **fuel cell**)

IT Fluoropolymers, uses

RL: DEV (Device component use); USES (Uses)  
(polyoxyalkylene-, sulfo-containing, ionomers; indirect measurement of fuel concentration in liquid feed fuel cell)

IT Ionomers  
RL: DEV (Device component use); USES (Uses)  
(polyoxyalkylenes, fluorine- and sulfo-containing; indirect measurement of fuel concentration in liquid feed fuel cell)

IT 67-56-1, **Methanol**, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(fuels; indirect measurement of fuel concentration in liquid feed **fuel cell**)

IT 7440-06-4, Platinum, uses 7440-18-8, Ruthenium, uses  
RL: CAT (Catalyst use); USES (Uses)  
(indirect measurement of fuel concentration in liquid feed fuel cell)

IT 77950-55-1, Nafion 115  
RL: DEV (Device component use); USES (Uses)  
(indirect measurement of fuel concentration in liquid feed fuel cell)

L20 ANSWER 6 OF 34 WPIX COPYRIGHT 2003 .THOMSON DERWENT on STN  
AN 2003-344769 [33] WPIX  
DNN N2003-275788 DNC C2003-090613  
TI Gas **sensor**, for e.g. for measuring concentration of hydrogen gas in fuel gas for use in fuel cell, comprises proton conduction layer, first and second electrodes, reference electrode and diffusion controlling portion.  
DC E36 J04 L03 S03 X16  
IN ISHIDA, N; KITANOYA, S; KONDO, T; NADANAMI, N; WATANABE, M  
PA (NITS) NGK SPARK PLUG CO LTD  
CYC 33  
PI EP 1288655 A2 20030305 (200333)\* EN 14p G01N027-407  
R: AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR IE IT LI LT LU LV MC  
MK NL PT RO SE SI SK TR  
CA 2400882 A1 20030303 (200333) EN G01N027-416  
JP 2003075404 A 20030312 (200333) 6p G01N027-416  
US 2003042139 A1 20030306 (200336) G01N027-407  
JP 2003149191 A 20030521 (200342) 7p G01N027-30  
ADT EP 1288655 A2 EP 2002-256064 20020902; CA 2400882 A1 CA 2002-2400882 20020829; JP 2003075404 A JP 2001-265756 20010903; US 2003042139 A1 US 2002-231209 20020830; JP 2003149191 A JP 2001-344781 20011109  
PRAI JP 2001-344781 20011109; JP 2001-265756 20010903  
IC ICM G01N027-30; G01N027-407; G01N027-416  
ICS H01M008-04; H01M008-10  
AB EP 1288655 A UPAB: 20030526  
NOVELTY - A gas **sensor** comprises a proton conduction layer between opposing first and second electrodes, a reference electrode in contact with the proton conduction layer, and a diffusion controlling portion between the first electrode and an atmosphere containing a gas to be measured. The diffusion controlling portion is located away from an end portion of the second electrode in a direction towards the reference electrode and on a side opposite to the reference electrode.  
DETAILED DESCRIPTION - A gas **sensor** comprises a proton conduction layer (1), a first electrode (3), a second electrode (5), a

reference electrode (7) in contact with the proton conduction layer, and a diffusion controlling portion (19) between the first electrode and an atmosphere containing a gas to be measured. An object gas component contained in the gas to be measured, which is introduced from the atmosphere via the diffusion controlling portion, is dissociatable, decomposable or reactable through the application of a voltage between the first and second electrodes such that the potential difference between the first electrode and the reference electrode becomes constant to generate protons, and the concentration of the object gas component is obtained on the basis of a limiting current generated as a result of the generated protons being pumped out via the proton conduction layer from the first electrode to the second electrode. The first and second electrodes are opposite each other while the proton conduction layer is held between them, and the diffusion controlling portion is located away from an end portion (T) of the second electrode in a direction towards the reference electrode and on a side opposite to the reference electrode.

An INDEPENDENT CLAIM is included for a further gas **sensor**, similar to that above, in which a first area S1 is an area of a portion of the first electrode on which a projected image of the second electrode is not superimposed when the second electrode is projected onto the first electrode, and a second area S2 is an area of a portion of the second electrode which is superimposed on the first electrode when the second electrode is projected onto the first electrode. The ratio S1/S2 is less than 0.35.

USE - Used as a gas **sensor**, e.g. a hydrogen **sensor**, for measuring the concentration of hydrogen gas in a fuel gas for use in a **fuel cell**, e.g. a polymer electrolyte **fuel cell**.

ADVANTAGE - The diffusion controlling portion is located away from an end portion of the second electrode located on a side towards the reference electrode, in a direction away from the reference electrode, such that an object gas component, e.g. hydrogen introduced from a hydrogen-rich atmosphere, can be pumped before hydrogen reaches a portion of the first electrode which encounters difficulty in pumping hydrogen, preventing the presence of a portion of the first electrode where the concentration of hydrogen is relatively high. In the course of controlling the potential difference between the first electrode and the reference electrode at a constant level, no portion of the first electrode becomes relatively low in concentration of hydrogen, preventing e.g. the dissociation of **methanol**, allowing the **concentration** of an object gas component, e.g. hydrogen, to be accurately measured without the influence of e.g. **methanol**.

DESCRIPTION OF DRAWING(S) - The figure shows a cutaway view of a hydrogen gas **sensor**.

Proton conduction layer 1  
First electrode 3  
Second electrode 5  
Reference electrode 7  
Diffusion controlling portions 19

Dwg.1/9

FS CPI EPI

FA AB; GI; DCN

MC CPI: E11-Q03J; E31-A03; J04-C02; J04-C04; L03-E04  
EPI: S03-E03B; S03-E14P; X16-C01C; X16-H02

L20 ANSWER 7 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN

AN 2003-259183 [26] WPIX

DNN N2003-205447 DNC C2003-067772

TI Process for **regulating the methanol concentration** of a direct **methanol fuel cell** system comprises varying a first system parameter, and introducing **methanol** from a **methanol** reservoir depending on the resulting voltage from the fuel solution.

DC E17 J04 X16

IN CHRISTEN, T; OHLER, C

PA (ALLM) ABB RES LTD; (DUPO) DU PONT DE NEMOURS & CO E I

CYC 101

PI EP 1280218 A1 20030129 (200326)\* DE 13p H01M008-04

R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT  
RO SE SI TR

WO 2003012904 A2 20030213 (200326) DE H01M008-04

RW: AT BE BG CH CY CZ DE DK EA EE ES FI FR GB GH GM GR IE IT KE LS LU  
MC MW MZ NL OA PT SD SE SK SL SZ TR TZ UG ZM ZW

W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK  
DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR  
KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ OM PH PL PT  
RO RU SD SE SG SI SK SL TJ TM TN TR TT TZ UA UG US UZ VN YU ZA ZM  
ZW

ADT EP 1280218 A1 EP 2001-810741 20010727; WO 2003012904 A2 WO 2002-CH382  
20020712

PRAI EP 2001-810741 20010727

IC ICM H01M008-04

AB EP 1280218 A UPAB: 20030428

NOVELTY - Process for **regulating the methanol concentration** of a direct **methanol fuel cell** system having a **fuel cell** and a separate **methanol** reservoir comprises varying a first system parameter; and introducing **methanol** from a **methanol** reservoir depending on the resulting voltage from the fuel solution.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for a process for determining the **methanol concentration** in a direct **methanol fuel cell**.

Preferred Features: Further system parameters are investigated before varying the first system parameter. A gas flow is increased during the variation. The current strength is varied in a determined region and a current-voltage characteristic line is acquired.

USE - Used in a direct **methanol fuel cell**

ADVANTAGE - Additional **methanol** are not required.

Dwg.0/4

FS CPI EPI

FA AB; DCN

MC CPI: E10-E04L1; E11-Q03; E31-N05C; J04-C03  
EPI: X16-C09

L20 ANSWER 8 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN  
AN 2003:248793 CAPLUS  
DN 139:9217  
TI Reliable and fast-responding **methanol concentration sensor** with novel design  
AU Qi, Zhigang; He, Chunzhi; Hollett, Mark; Attia, Alan; Kaufman, Arthur  
CS H Power Corporation, Belleville, NJ, 07109, USA  
SO Electrochemical and Solid-State Letters (2003), 6(5), A88-A90  
CODEN: ESLEF6; ISSN: 1099-0062  
PB Electrochemical Society  
DT Journal  
LA English  
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
AB A reliable, fast-responding, and low-cost **methanol concn sensor** has been constructed. The **sensor** electrochem. measures the **concentration** of **methanol** solution used in a direct **methanol fuel cell** (DMFC). The novelty of the **sensor** lies in that it comprises a flexible and bendable composite of several layers, which are wrapped around a tube having an aperture that provides fluid contact between the sensing component and the reactant flow stream. Such a **sensor** can be easily incorporated into the **methanol** solution flow loop in a DMFC system.  
ST **fuel cell methanol concn sensor**  
IT **Fuel cells**  
**Sensors**  
(reliable and fast-responding **methanol concentration sensor** with novel design)  
IT 67-56-1, Methanol, analysis  
RL: ANT (Analyte); ANST (Analytical study)  
(reliable and fast-responding **methanol concentration sensor** with novel design)  
RE.CNT 14 THERE ARE 14 CITED REFERENCES AVAILABLE FOR THIS RECORD  
RE  
(1) Baldauf, M; J Power Sources 1999, V84, P161 CAPLUS  
(2) Barton, S; J Electrochem Soc 1998, V145, P3783 CAPLUS  
(3) Heinzl, A; J Power Sources 1999, V84, P70 CAPLUS  
(4) Kumagai, T; US 4810597 1989  
(5) McNicol, B; J Power Sources 1999, V83, P15 CAPLUS  
(6) Narayanan, S; WO 98/45694 1998 CAPLUS  
(7) Narayanan, S; US 6306285 B1 2001 CAPLUS  
(8) Narayanan, S; Electrochem Solid-State Lett 2000, V3, P117 CAPLUS  
(9) Nogami, Y; US 4939467 1990 CAPLUS  
(10) Nogami, Y; US 5196801 1993  
(11) Scott, K; J Power Sources 1999, V83, P204 CAPLUS  
(12) Scott, K; J Power Sources 1999, V79, P43 CAPLUS  
(13) Wasmus, S; J Electroanal Chem 1999, V461, P14 CAPLUS  
(14) Wohlfarth, C; CRC Handbook of Chemistry and Physics, 75th ed 1994, P6

L20 ANSWER 9 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN



AN 2003:600421 CAPLUS  
DN 139:216896  
TI Study on the methanol permeability in polyacrylamide solid gel membranes  
AU Song, Wen-sheng; Li, Lei; Wang, Yu-xin  
CS Research Center of Chemical Engineering, School of Chemical Engineering and Technology, Tianjin University, Tianjin, 300072, Peop. Rep. China  
SO Huagong Keji (2003), 11(2), 15-18  
CODEN: HUKFEF; ISSN: 1008-0511  
PB Huagong Keji Bianjibu  
DT Journal  
LA Chinese  
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
AB Through the method of membrane diffusion, the **methanol** permeability in polyacrylamide (PAAM) solid gel membranes was tested in situ with the differential refractive **detector**. The exptl. results showed that with the increase of PAAM concentration in PAAM solid gel membranes, the **methanol** permeability in PAAM solid gel membranes had an obvious decrease, and with the increase of crosslinking degree in PAAM solid gel membranes in the case of the fixed PAAM **concentration**, the **methanol** permeability in PAAM solid gel membranes brought the min. into existence. Accordingly, PAAM solid gel membranes can be used as **methanol** impermeable electrolyte membranes in direct **methanol fuel cell** (DMFC) after doped elec. conducting components.  
ST **methanol** permeability polyacrylamide solid gel membrane;  
fuel cell polyacrylamide solid gel membrane  
IT Fuel cell electrolytes  
(study on **methanol** permeability in polyacrylamide solid gel membranes for potential use in direct **methanol fuel cell**)  
IT 67-56-1, **Methanol**, processes 9003-05-8, Polyacrylamide  
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)  
(study on **methanol** permeability in polyacrylamide solid gel membranes for potential use in direct **methanol fuel cell**)  
  
L20 ANSWER 10 OF 34 COMPENDEX COPYRIGHT 2003 EEI on STN  
AN 2003(21):2720 COMPENDEX  
TI Reliable and fast-responding **methanol concentration sensor** with novel design.  
AU Qi, Zhigang (H Power Corporation, Belleville, NJ 07109, United States); He, Chunzhi; Hollett, Mark; Attia, Alan; Kaufman, Arthur  
SO Electrochemical and Solid-State Letters v 6 n 5 May 2003 2003.p A88-A90  
CODEN: ESLEF6 ISSN: 1099-0062  
PY 2003  
DT Journal  
TC Experimental  
LA English  
AB A reliable, fast-responding, and low-cost **methanol concentration sensor** has been constructed. The **sensor** electrochemically measures the **concentration** of

methanol solution used in a direct methanol fuel cell (DMFC). The novelty of the **sensor** lies in that it comprises a flexible and bendable composite of several layers, which are wrapped around a tube having an aperture that provides fluid contact between the sensing component and the reactant flow stream. Such a **sensor** can be easily incorporated into the methanol solution flow loop in a DMFC system. 14 Refs.

CC 801.4.1 Electrochemistry; 732.2 Control Instrumentation; 801.1 Chemistry (General); 804.1 Organic Components; 714.1 Electron Tubes; 701.1 Electricity: Basic Concepts and Phenomena  
CT \*Electrochemical **sensors**; **Fuel cells**; Electrodes; Permittivity; Temperature; Capacitance; **Methanol**  
ST **Methanol concentration sensor**; Direct methanol fuel cell

L20 ANSWER 11 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN DUPLICATE 3  
AN 2002:466368 CAPLUS  
DN 137:35533

TI Apparatus and methods for **sensor**-less optimization of methanol concentration in a direct methanol fuel cell system

IN Acker, William P.; Sadler, Michael S.; Gottesfeld, Shimshon  
PA MTI Microfuel Cells, Inc., USA  
SO PCT Int. Appl., 24 pp.  
CODEN: PIXXD2

DT Patent  
LA English  
ICI H01

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 80

FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2002049125	A2	20020620	WO 2001-US42960	20011120
	W: BA, BB, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EC, EE, ES, FI, GB, ID, IL, IN, JP, KG, KP, KZ, LK, LR, LT, LV, MG, MK, MN, MW, MX, RO, RU, SE, SG, SI, SL, TJ, TM, TR, TT, UA, VN, RU, TJ, TM				
	RW: GH, GM, KE, LS, MZ, SD, SL, TZ, ZW, AT, BE, CH, CY, DK, ES, FI, FR, GB, GR, IE, IT, LU, NL, CF, CG, CI, GA, GN, MR, NE, SN, TD, TG				
	US 6589679	B1	20030708	US 2000-721290	20001122
	AU 2002043210	A5	20020624	AU 2002-43210	20011120
PRAI	US 2000-721290	A	20001122		
	US 2001-40502	A	20011109		
	WO 2001-US42960	W	20011120		

AB Apparatus and methods are disclosed for **regulating methanol concentration** in a direct methanol fuel cell system without the need for a **methanol concentration sensor**. One or more operating characteristics of the **fuel cell**, such as the potential across the load, open circuit potential, potential at the anode proximate to the end of the fuel flow path or short circuit current of the **fuel cell**, are used to actively control the **methanol concentration**

ST **fuel cell methanol concn**  
optimization app

IT **Fuel cells**  
Optimization  
(apparatus and methods for **sensor-less** optimization of  
**methanol concentration** in direct **methanol**  
**fuel cell** system)

IT 67-56-1, **Methanol**, uses  
RL: ANT (Analyte); PEP (Physical, engineering or chemical process); PYP  
(Physical process); TEM (Technical or engineered material use); ANST  
(Analytical study); PROC (Process); USES (Uses)  
(apparatus and methods for **sensor-less** optimization of  
**methanol concentration** in direct **methanol**  
**fuel cell** system)

L20 ANSWER 12 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN DUPLICATE 4  
AN 2002:143091 CAPLUS  
DN 136:203055

TI **Regulation** of the fuel concentration in the anode fluid of a  
direct **methanol fuel cell** by determination  
of carbon dioxide in the exhaust gas of the cathode

IN Preidel, Walter  
PA Siemens Aktiengesellschaft, Germany  
SO PCT Int. Appl., 15 pp.  
CODEN: PIXXD2

DT Patent  
LA German

IC ICM H01M008-04

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 79

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2002015314	A1	20020221	WO 2001-DE2976	20010803
W: CA, CN, JP, US				
RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR				
DE 10039959	A1	20020307	DE 2000-10039959	20000816
EP 1310007	A1	20030514	EP 2001-962605	20010803
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI, CY, TR				
US 2003146094	A1	20030807	US 2003-368154	20030218
PRAI DE 2000-10039959	A	20000816		
WO 2001-DE2976	W	20010803		

AB The fuel concentration in the anode fluid of a direct **methanol**  
**fuel cell** is **regulated** by determination of carbon  
dioxide in the exhaust gas of the cathode. A carbon dioxide  
**sensor** is integrated in the gas stream behind a cooler and a  
pressure valve. The CO<sub>2</sub>-concentration is equivalent to the concentration of  
converted **methanol**.

ST direct **methanol fuel cell** carbon dioxide  
**sensor concn** detn

IT Gas sensors  
 (carbon dioxide; **regulation** of the fuel concentration in the anode fluid of a direct **methanol fuel cell** by determination of carbon dioxide in the exhaust gas of the cathode)

IT Combustion gases  
 (determination of CO2 in; **regulation** of the fuel concentration in the anode fluid of a direct **methanol fuel cell** by determination of carbon dioxide in the exhaust gas of the cathode)

IT Fuel cells  
 (direct **methanol**; **regulation** of the fuel concentration in the anode fluid of a direct **methanol fuel cell** by determination of carbon dioxide in the exhaust gas of the cathode)

IT 124-38-9P, Carbon dioxide, preparation  
 RL: ANT (Analyte); BYP (Byproduct); ANST (Analytical study); PREP (Preparation)  
 (determination of; **regulation** of the fuel concentration in the anode fluid of a direct **methanol fuel cell** by determination of carbon dioxide in the exhaust gas of the cathode)

IT 67-56-1, **Methanol**, uses  
 RL: ANT (Analyte); NUU (Other use, unclassified); RCT (Reactant); ANST (Analytical study); RACT (Reactant or reagent); USES (Uses)  
 (determination of; **regulation** of the fuel concentration in the anode fluid of a direct **methanol fuel cell** by determination of carbon dioxide in the exhaust gas of the cathode)

RE.CNT 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

- (1) Anon; PATENT ABSTRACTS OF JAPAN 1991, V015(288), PE-1092
- (2) Anon; PATENT ABSTRACTS OF JAPAN 1993, V017(152), PE-1340
- (3) Fuji Electric Co Ltd; JP 03101061 A 1991
- (4) Mitsubishi Electric Corp; JP 04319263 A 1992
- (5) Pantel, K; WO 9750140 A 1997 CAPLUS
- (6) Scott, K; JOURNAL OF POWER SOURCES 1999, V79(1), P43 CAPLUS
- (7) Toyota Motor Co Ltd; EP 0710996 A 1996 CAPLUS

L20 ANSWER 13 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

AN 2002:449978 CAPLUS

DN 137:22390

TI A **methanol sensor** operated in a driven mode for **fuel cell** use

IN Ren, Xiaoming; Gottesfeld, Shimshon

PA The Regents of the University of California, USA

SO PCT Int. Appl., 15 pp.

CODEN: PIXXD2

DT Patent

LA English

IC ICM G01N027-406

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 80

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI WO 2002046733 A1 20020613 WO 2001-US44840 20011031  
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN,  
CO, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM,  
HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS,  
LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO,  
RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN,  
YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM  
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY,  
DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF,  
BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

AU 2002017960 A5 20020618 AU 2002-17960 20011031

PRAI US 2000-729735 A 20001204  
WO 2001-US44840 W 20011031

AB A **sensor** outputs a **signal** related to the **concn**  
. of a **methanol** in an aqueous solution The **sensor** includes a  
membrane electrode assembly (MEA) having a cathode side and an anode side.  
A cathode current collector supports the cathode side of the MEA and has a  
flow channel there-through for providing access of the methanol solution to  
the cathode side of the MEA. An anode current collector supports the  
anode side of the MEA and is sealed to the MEA to exclude air from the  
anode side of the MEA. A voltage source is connected to the MEA for  
electro-oxidation of methanol permeating across MEA from the aqueous methanol  
solution to produce an output current that is functionally related to the  
**concentration of methanol** in the aqueous solution without interference  
of air on the methanol oxidation electrode.

ST **fuel cell methanol sensor**

IT **Sensors**

(electrochem.; **methanol sensor** operated in driven  
mode for **fuel cell** use)

IT **Fuel cells**

Oxidation, electrochemical

(**methanol sensor** operated in driven mode for  
**fuel cell** use)

IT 67-56-1, **Methanol**, uses

RL: ANT (Analyte); TEM (Technical or engineered material use); ANST  
(Analytical study); USES (Uses)

(**methanol sensor** operated in driven mode for  
**fuel cell** use)

RE.CNT 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD  
RE

- (1) Barton; J Electrochem Soc 1998, V145(11), P3783 CAPLUS
- (2) Kring; US 3852169 A 1974 CAPLUS
- (3) Tomantschger; US 5302274 A 1994 CAPLUS
- (4) van Dine; US 5573866 A 1996 CAPLUS

L20 ANSWER 14 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

AN 2002:72470 CAPLUS

DN 136:105195

TI Method for fabrication of direct **methanol fuel**  
**cell** system

IN Koripella, Chowdary Ramesh; Ooms, William Jay; Wilcox, David L.; Bostaph,  
Joseph W.

PA Motorola, Inc., USA  
 SO PCT Int. Appl., 28 pp.  
 CODEN: PIXXD2  
 DT Patent  
 LA English  
 IC ICM H01M008-00  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2002007241	A2	20020124	WO 2001-US22524	20010717
	WO 2002007241	A3	20030904		
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
	US 6387559	B1	20020514	US 2000-618399	20000718
	TW 508864	B	20021101	TW 2001-90117450	20010717
	EP 1358689	A2	20031105	EP 2001-958992	20010717
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI, CY, TR				
PRAI	US 2000-618399	A	20000718		
	WO 2001-US22524	W	20010717		
AB	A fuel cell system and method of forming the fuel cell system are disclosed including a base portion, formed of a singular body, and having a major surface. At least one fuel cell membrane electrode assembly is formed on the major surface of the base portion. A fluid supply channel including a mixing chamber is defined in the base portion and communicating with the fuel cell membrane electrode assembly for supplying a fuel-bearing fluid to the membrane electrode assembly. An exhaust channel including a water recovery and recirculation system is defined in the base portion and communicating with the membrane electrode assembly. The membrane electrode assembly and the cooperating fluid supply channel and cooperating exhaust channel form a single fuel cell assembly.				
ST	fuel cell direct methanol fabrication method				
IT	Sensors				
	(MeOH concentration; method for fabrication of direct methanol fuel cell system)				
IT	Ceramics				
	(base portion; method for fabrication of direct methanol fuel cell system)				
IT	Glass, uses				
	Plastics, uses				
	RL: TEM (Technical or engineered material use); USES (Uses)				
	(base portion; method for fabrication of direct methanol fuel cell system)				
IT	Fuel cell electrodes				

**Fuel cells**

(method for fabrication of direct **methanol fuel cell** system)

IT 7440-21-3, Silicon, uses

RL: TEM (Technical or engineered material use); USES (Uses)  
(base portion; method for fabrication of direct **methanol fuel cell** system)

IT 7439-98-7, Molybdenum, uses 7440-02-0, Nickel, uses 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 7440-18-8, Ruthenium, uses 7440-57-5, Gold, uses 11130-73-7, Tungsten carbide

RL: DEV (Device component use); USES (Uses)  
(method for fabrication of direct **methanol fuel cell** system)

IT 124-38-9, Carbon dioxide, processes

RL: REM (Removal or disposal); PROC (Process)  
(method for fabrication of direct **methanol fuel cell** system)

IT 67-56-1, **Methanol**, uses

RL: TEM (Technical or engineered material use); USES (Uses)  
(method for fabrication of direct **methanol fuel cell** system)

L20 ANSWER 15 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

AN 2002:505270 CAPLUS

DN 137:65748

TI Apparatus and methods for **sensor**-less optimization of **methanol concentration** in a direct **methanol fuel cell** system

IN Acker, William P.; Adler, Michael S.; Gottesfeld, Shimshon

PA USA

SO U.S. Pat. Appl. Publ., 14 pp., Cont.-in-part of U. S. Ser. No. 721,290.  
CODEN: USXXCO

DT Patent

LA English

IC ICM H01M008-04

NCL 429022000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2002086193	A1	20020704	US 2001-40502	20011109
	US 6589679	B1	20030708	US 2000-721290	20001122
	AU 2002043210	A5	20020624	AU 2002-43210	20011120
PRAI	US 2000-721290	A2	20001122		
	US 2001-40502	A	20011109		
	WO 2001-US42960	W	20011120		

AB Apparatus and methods are disclosed for **regulating methanol concentration** in a direct **methanol fuel cell** system without the need for a **methanol concentration sensor**. One or more operating characteristics of the **fuel cell**, such as the potential across the load, open circuit potential, potential at the anode proximate to the end of the fuel flow

path or short circuit current of the **fuel cell**, are used to actively control the **methanol concentration**

ST sensorless optimization **methanol concn** direct **methanol fuel cell** system

IT Electric potential

**Fuel cells**

Optimization

(apparatus and methods for **sensor-less** optimization of **methanol concentration** in direct **methanol fuel cell** system)

IT Control apparatus

(micro-; apparatus and methods for **sensor-less** optimization of **methanol concentration** in direct **methanol fuel cell** system)

IT Computers

(microprocessors; apparatus and methods for **sensor-less** optimization of **methanol concentration** in direct **methanol fuel cell** system)

IT 67-56-1, **Methanol**, uses

RL: ANT (Analyte); TEM (Technical or engineered material use); ANST (Analytical study); USES (Uses)

(apparatus and methods for **sensor-less** optimization of **methanol concentration** in direct **methanol fuel cell** system)

L20 ANSWER 16 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

AN 2002:466577 CAPLUS

DN 137:35539

TI Direct **methanol fuel cell** system including an integrated **methanol sensor** and method of fabrication

IN Bostaph, Joseph W.; Koripella, Chowdary R.; Fisher, Allison M.

PA Motorola, Inc., USA

SO U.S. Pat. Appl. Publ., 10 pp.

CODEN: USXXCO

DT Patent

LA English

IC ICM H01M008-04

ICS H01M008-10; H01M004-90; B05D005-12; H01M004-96; H01M004-92

NCL 429022000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 80

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2002076589	A1	20020620	US 2000-738130	20001215
	WO 2002049132	A2	20020620	WO 2001-US44053	20011119
	WO 2002049132	A3	20030327		

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PH, PL,



PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG,  
 UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM  
 RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, CH,  
 CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR,  
 BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

AU 2002041511 A5 20020624 AU 2002-41511 20011119

EP 1352441 A2 20031015 EP 2001-988179 20011119

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,  
 IE, SI, LT, LV, FI, RO, MK, CY, AL, TR

TW 531933 B 20030511 TW 2001-90129665 20011130

PRAI US 2000-738130 A 20001215

WO 2001-US44053 W 20011119

AB A **fuel cell** system and method of forming the  
**fuel cell** system including a base portion, formed of a  
 singular body, and having a major surface are disclosed. At least one  
**fuel cell** membrane electrode assembly is formed on the  
 major surface of the base portion. A fluid supply channel including a  
 mixing chamber is defined in the base portion and communicating with the  
**fuel cell** membrane electrode assembly for supplying a  
 fuel-bearing fluid to the membrane electrode assembly. A **methanol**  
**concentration sensor** is positioned to communicate with the  
**fuel cell** membrane electrode assembly and the  
 fuel-supply channel for **regulating** the mixture of fuel to the  
 electrode assembly. An exhaust channel including a water recovery and  
 recirculation system is defined in the base portion and communicating with  
 the membrane electrode assembly.

ST **methanol fuel cell** system integrated  
**methanol sensor**

IT **Sensors**  
 (amperometric; direct **methanol fuel cell**  
 system including integrated **methanol sensor** and  
 method of fabrication)

IT Ceramics  
 (base portion; direct **methanol fuel cell**  
 system including integrated **methanol sensor** and  
 method of fabrication)

IT Glass, uses  
 Plastics, uses  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (base portion; direct **methanol fuel cell**  
 system including integrated **methanol sensor** and  
 method of fabrication)

IT Conducting polymers  
**Fuel cell** electrodes  
**Fuel cells**  
 (direct **methanol fuel cell** system  
 including integrated **methanol sensor** and method of  
 fabrication)

IT **Sensors**  
 (potentiometric; direct **methanol fuel cell**  
 system including integrated **methanol sensor** and  
 method of fabrication)

IT 7440-21-3, Silicon, uses 7782-42-5, Graphite, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(base portion; direct **methanol fuel cell**  
system including integrated **methanol sensor** and  
method of fabrication)

IT 67-56-1, **Methanol**, uses  
RL: ANT (Analyte); TEM (Technical or engineered material use); ANST  
(Analytical study); USES (Uses)  
(direct **methanol fuel cell** system  
including integrated **methanol sensor** and method of  
fabrication)

IT 7439-98-7, Molybdenum, uses 7440-02-0, Nickel, uses 7440-05-3,  
Palladium, uses 7440-06-4, Platinum, uses 7440-18-8, Ruthenium, uses  
7440-33-7, Tungsten, uses 7440-57-5, Gold, uses  
RL: DEV (Device component use); USES (Uses)  
(direct **methanol fuel cell** system  
including integrated **methanol sensor** and method of  
fabrication)

IT 7732-18-5, Water, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(direct **methanol fuel cell** system  
including integrated **methanol sensor** and method of  
fabrication)

L20 ANSWER 17 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN  
AN 2002-519821 [55] WPIX  
DNN N2002-411430 DNC C2002-147127  
TI Direct **methanol fuel cell** system for  
portable electronic devices, has multiple electrical components in base  
portion for electrical integration of **fuel cell**  
assembly with **methanol concentration sensor**.

DC L03 P42 X16  
IN BOSTAPH, J W; FISHER, A M; KORIPELLA, C R  
PA (MOTI) MOTOROLA INC  
CYC 100  
PI WO 2002049132 A2 20020620 (200255)\* EN 30p H01M008-00  
RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ  
NL OA PT SD SE SL SZ TR TZ UG ZM ZW  
W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK  
DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR  
KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PH PL PT RO  
RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW  
US 2002076589 A1 20020620 (200255) H01M008-04  
AU 2002041511 A 20020624 (200267) H01M008-00  
EP 1352441 A2 20031015 (200368) EN H01M008-10  
R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT  
RO SE SI TR  
TW 531933 A 20030511 (200372) H01M008-04  
ADT WO 2002049132 A2 WO 2001-US44053 20011119; US 2002076589 A1 US 2000-738130  
20001215; AU 2002041511 A AU 2002-41511 20011119; EP 1352441 A2 EP  
2001-988179 20011119, WO 2001-US44053 20011119; TW 531933 A TW 2001-129665  
20011130

FDT AU 2002041511 A Based on WO 2002049132; EP 1352441 A2 Based on WO 2002049132

PRAI US 2000-738130 20001215

IC ICM H01M008-00; H01M008-04; H01M008-10

ICS B05D005-12; H01M004-90; H01M004-92; H01M004-96; H01M008-24

AB WO 200249132 A UPAB: 20020829

NOVELTY - Exhaust channel (38) in base portion (14) with electrical components for integration of **fuel cell** assembly, is spaced from fluid supply channel (32) and ejects fluid from **fuel cell** membrane electrode assembly. **Methanol concentration sensor** (39) is connected to **fuel cell** membrane electrode assembly and channel (32) which in combination with exhaust channel form single **fuel cell** assembly (12).

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are included for the following:

(1) **fuel cell** array apparatus; and

(2) **fuel cell** array apparatus fabricating method.

USE - For supplying power to portable electronic device.

ADVANTAGE - The system is semi-self contained system which is not orientation sensitive and hence it is easily movable. The provision of **sensor** enables to **regulate methanol concentration** in supplied fuel.

DESCRIPTION OF DRAWING(S) - The figure shows the simplified sectional view of direct **methanol fuel cell** system.

**Fuel cell** assembly 12

Base portion 14

Fluid supply channel 32

Exhaust channel 38

**Methanol concentration sensor** 39

Dwg.1/6

FS CPI EPI GMPI

FA AB; GI

MC CPI: L03-E04

EPI: X16-C

L20 ANSWER 18 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN

AN 2002-547777 [58] WPIX

DNN N2002-433653 DNC C2002-155354

TI **Methanol concentration sensor**, for use with fuel supply, comprises membrane electrode, anode and cathode current collector, and current **sensor** to measure current to provide **signal**.

DC E17 J04 S03 X16

IN GOTTFELD, S; REN, X

PA (REGC) UNIV CALIFORNIA

CYC 95

PI WO 2002046732 A1 20020613 (200258)\* EN 12p G01N027-406

RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ  
NL OA PT SD SE SL SZ TR TZ UG ZW

W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK  
DM DZ EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ

LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU SD  
SE SG SI SK SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW  
AU 2002017958 A 20020618 (200262) G01N027-406  
US 6488837 B1 20021203 (200301) G01N027-406  
ADT WO 2002046732 A1 WO 2001-US44836 20011031; AU 2002017958 A AU 2002-17958  
20011031; US 6488837 B1 US 2000-730142 20001204  
FDT AU 2002017958 A Based on WO 2002046732  
PRAI US 2000-730142 20001204  
IC ICM G01N027-406  
ICS H01M010-48  
AB WO 200246732 A UPAB: 20020910  
NOVELTY - **Sensor** for outputting **signal** for  
**concentration** of **methanol** in aqueous solution comprises  
membrane electrode with anode and cathode sides, an anode current  
collector with a flow channel for the solution and to control access of  
the **methanol** to the anode side, a cathode current collector  
allowing access of air over the cathode side, and a current **sensor**  
to measure current in a short circuit across the electrodes to provide the  
**signal**.  
DETAILED DESCRIPTION - **Sensor** for outputting **signal**  
for **concentration** of **methanol** in aqueous solution  
comprises membrane electrode with anode and cathode sides for  
**methanol** oxidation and oxygen reduction respectively, an anode  
current collector supporting the anode side with a flow channel to flow a  
stream of the solution and form a physical barrier to control access of  
the **methanol** to the anode side, a cathode current collector  
supporting the cathode side and allowing access of air over the cathode  
side, and a current **sensor** to measure current in a short circuit  
across the electrodes to provide a **signal** that may be related to  
the concentration..  
An INDEPENDENT CLAIM is included for a method for determining the  
**concentration** of **methanol** in an aqueous solution using  
the above **sensor**.  
USE - For sensing **methanol concentration** in  
direct **methanol fuel cell** power system.  
ADVANTAGE - The **sensor** is self driven and shows a good  
linear response to the **methanol concentration** range  
used in direct **methanol fuel cells**.  
Dwg.0/3  
FS CPI EPI  
FA AB; DCN  
MC CPI: E10-E04L1; E11-Q03J; J04-C02  
EPI: S03-E03A; S03-E03C; X16-C; X16-H02  
L20 ANSWER 19 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN  
AN 2002-731506 [79] WPIX  
DNN N2002-576667  
TI **Fuel cell** system e.g. direct **methanol**  
**fuel cell** system increases **fuel**  
**concentration** at anode and increases oxidation of crossover fuel  
at cathode when **regulator** temperature is below specified range.  
DC X16

IN ACKER, W P; DAILEY, W W; GOTTESFELD, S  
PA (ACKE-I) ACKER W P; (DAIL-I) DAILEY W W; (GOTT-I) GOTTESFELD S; (MTIM-N)  
MTI MICROFUEL CELLS INC  
CYC 100  
PI US 2002122966 A1 20020905 (200279)\* 16p H01M008-04  
WO 2002071520 A1 20020912 (200279) EN H01M008-00  
RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ  
NL OA PT SD SE SL SZ TR TZ UG ZM ZW  
W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK  
DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR  
KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ OM PH PL PT  
RO RU SD SE SG SI SK SL TJ TM TN TR TT TZ UA UG UZ VN YU ZA ZM ZW  
ADT US 2002122966 A1 US 2001-798314 20010302; WO 2002071520 A1 WO 2002-US4161  
20020213  
PRAI US 2001-798314 20010302  
IC ICM H01M008-00; H01M008-04  
ICS H01M004-00; H01M008-12  
AB US2002122966 A UPAB: 20021209  
NOVELTY - A membrane electrolyte (103) is arranged between an anode (104)  
and a cathode (102). A temperature **regulator** is connected to a  
fuel source and the anode. The **regulator** increases fuel  
concentration at anode to promote fuel crossover through the membrane and  
increases oxidation of crossover fuel at cathode when the  
**regulator** temperature is below a specified range.  
DETAILED DESCRIPTION - An INDEPENDENT CLAIM is included for  
temperature control method.  
USE - For e.g. direct **methanol fuel cell**  
system.  
ADVANTAGE - By increasing amount of fuel to the cathode, the  
temperature is increased and hence cold start' performance of the  
**fuel cell** is improved.  
DESCRIPTION OF DRAWING(S) - The figure shows the block diagram of the  
direct **methanol fuel cell** power system.  
Cathode 102  
Membrane electrolyte 103  
Anode 104  
Dwg.3/9  
FS EPI  
FA AB; GI  
MC EPI: X16-C09; X16-C15; X16-K  
L20 ANSWER 20 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN  
AN 2002-588548 [63] WPIX  
CR 2002-105034 [14]; 2003-352063 [33]; 2003-465720 [44]  
DNN N2002-466899 DNC C2002-166566  
TI Generation of hydrogen used as **fuel**, involves electro-oxidizing  
**methanol** at anode in electrolytic cell to form protons  
and electro-reducing protons at cathode to form hydrogen.  
DC A97 E36 J03 X25  
IN CHUN, W; JEFFRIES-NAKAMURA, B; NARAYANAN, S R; VALDEZ, T I  
PA (CALY) CALIFORNIA INST OF TECHNOLOGY  
CYC 1

PI US 6368492 B1 20020409 (200263)\* 11p C25B001-02  
ADT US 6368492 B1 Cont of US 1997-926947 19970910, Div ex US 1998-123957  
19980728, US 2000-506170 20000217  
PRAI US 1997-926947 19970910; US 1998-123957 19980728; US 2000-506170  
20000217  
IC ICM C25B001-02  
AB US 6368492 B UPAB: 20030710

NOVELTY - Method for generating hydrogen gas involves circulating **methanol** and water around anode (112) of electrolytic cell (102) comprising polymeric electrolyte membrane (110) disposed between anode and cathode (114), supplying DC electrical current to anode and cathode, inducing electro-oxidation of **methanol** at anode to produce protons, and initiating electro-reduction of protons at cathode to produce hydrogen.

USE - Used as fuel for hydrogen/oxygen **fuel cells** for producing electrical energy which is used to power an electrically driven device such as electrical vehicles and engines. The hydrogen generators can be used on-site in metallurgical process for annealing, reduction and alloy processing; and for gas chromatograph, flame ionization **detectors** in analytical laboratories.

ADVANTAGE - **Methanol** can be electrolyzed to hydrogen and carbon dioxide at a low operating voltage of 0.4 V. Hence energy consumption and production cost of hydrogen (including **methanol** cost) are reduced by more than 70% and 50%, respectively when compared the energy consumption and production cost of hydrogen produced by electrolyzing water. The solid membrane electrolytic cell in the electrolytic cell eliminates the conventional liquid acidic or alkaline electrolyte which causes various problems including corrosion of cell components, poor activity of catalysts, and parasitic shunt currents. The solid membrane electrolytic cell is robust and compact. The electrolytic cell is free of potassium hydroxide, hence resists performance degradation due to the formation of soluble carbonates. The electrolytic cells can be used in a portable or stationery mode for small and large-scale hydrogen generators. The hydrogen generators can be coupled with solar cell to efficiently harness solar energy.

DESCRIPTION OF DRAWING(S) - The figure shows the hydrogen generator comprising electrolytic cell having solid state membrane electrolyte.

Electrolytic cell 102

Membrane 110

Anode 112

Cathode 114

Dwg.1/5

FS CPI EPI

FA AB; GI; DCN

MC CPI: A12-E06B; E11-N; E31-A02; J03-B; N07-G  
EPI: X25-R01A

L20 ANSWER 21 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN

AN 2003-055173 [05] WPIX

TI Fuel supply device and method in fuel cell.

DC X16

IN HWANG, Y J; KIM, H D; KIM, I G; LEE, M H; LEE, S H; PARK, I G; PARK, M S;

YOON, H S

PA (GLDS) LG ELECTRONICS INC

CYC 1

PI KR 2002056137 A 20020710 (200305)\* 1p H01M008-04

ADT KR 2002056137 A KR 2000-85445 20001229

PRAI KR 2000-85445 20001229

IC ICM H01M008-04

AB KR2002056137 A UPAB: 20030121

NOVELTY - Provided are a fuel supply device which is suitable to maintain the **concentration** of mixed **methanol** solution stored in fuel storage tank at constant level, and a method for fuel supply in the device.

DETAILED DESCRIPTION - The fuel supply device in **fuel cell** comprises a stack(10) which comprises a cathode and an anode. In the device, mixed **methanol** solution(41) which is supplied from a storage tank(42) of the mixed **methanol** solution to the anode by liquid fuel supply line(43), is electrochemically reacted with air supplied to the cathode to form electromotive force. The device comprises a concentration **sensor**(51) for **detecting** the **concentration** of the mixed **methanol** solution; a water supply unit(52) which consists of water storage tank(62), water supply line(63) and valve; and a **methanol** supply unit(53) which consists of a **methanol** storage tank(72), a **methanol** supply line(73) and a valve.

Dwg.1/10

FS EPI

FA AB; GI

MC EPI: X16-C09

L20 ANSWER 22 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN

AN 2003-055172 [05] WPIX

TI Fuel supply device in fuel cell.

DC X16

IN HWANG, Y J; KIM, H D; KIM, I G; LEE, M H; LEE, S H; PARK, I G; PARK, M S; YOON, H S

PA (GLDS) LG. ELECTRONICS INC

CYC 1

PI KR 2002056136 A 20020710 (200305)\* 1p H01M008-04

ADT KR 2002056136 A KR 2000-85444 20001229

PRAI KR 2000-85444 20001229

IC ICM H01M008-04

AB KR2002056136 A UPAB: 20030121

NOVELTY - Provided is a fuel supply device which is suitable to **detect** the **concentration** of mixed **methanol** solution stored in fuel storage tank and maintain the **concentration** of the mixed **methanol** solution at appropriate level.

DETAILED DESCRIPTION - The fuel supply device in **fuel cell**(in the **fuel cell**, liquid fuel is supplied to electrode, and an electromotive force is generated by chemical reaction of the liquid fuel) comprises an absorbance **sensor** for **detecting** the concentration change and the consumption state of

the liquid fuel by **detecting** an absorbance difference of the liquid fuel. The absorbance **sensor** consists of a luminescent **sensor**(45) for light-emitting; a photosensor(45') for receiving ultraviolet; an electronic controller(46) for logical calculation of data; and a display unit(47) for displaying the result of the controller(46).

Dwg.1/10

FS EPI  
FA AB; GI  
MC EPI: X16-C09

L20 ANSWER 23 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN

AN 2003-055171 [05] WPIX

TI Fuel supply device in fuel cell.

DC X16

IN HWANG, Y J; KIM, H D; KIM, I G; LEE, M H; LEE, S H; PARK, I G; PARK, M S;  
YOON, H S

PA (GLDS) LG ELECTRONICS INC

CYC 1

PI KR 2002056135 A 20020710 (200305)\* 1p H01M008-04

ADT KR 2002056135 A KR 2000-85443 20001229

PRAI KR 2000-85443 20001229

IC ICM H01M008-04

AB KR2002056135 A UPAB: 20030121

NOVELTY - Provided is a fuel supply device which is suitable to **detect** the **concentration** of mixed **methanol** solution stored in fuel storage tank and maintain the **concentration** of the mixed **methanol** solution at appropriate level.

DETAILED DESCRIPTION - The fuel supply device in **fuel cell**(in the **fuel cell**, liquid fuel is supplied to electrode, and an electromotive force is generated by chemical reaction of the liquid fuel) comprises a **sensor** for **detecting** the concentration change and the consumption state of the liquid fuel by **detecting** conductivity difference of the liquid fuel. The **sensor** consists of a conductivity **sensor**(45) for **detecting** conductivity; an electronic controller(46) for logical calculation of data and value **detected** in **sensor**(45); and a display unit(47) for displaying the result of the controller(46).

Dwg.1/10

FS EPI  
FA AB; GI  
MC EPI: X16-C09

L20 ANSWER 24 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

AN 2001:360323 CAPLUS

DN 134:355479

TI **Fuel cell (methanol) sensor** with small load resistance and high oxidant supply

IN Zhang, Jiujun; Colbow, Kevin M.; Wilkinson, David P.; Muller, Jens

PA Ballard Power Systems Inc., Can.

SO PCT Int. Appl., 38 pp.

CODEN: PIXXD2



DT Patent  
 LA English  
 IC ICM H01M008-04  
 ICS G01N027-49  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2001035478	A1	20010517	WO 2000-CA1240	20001024
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
	US 6527943	B1	20030304	US 1999-435977	19991108
PRAI	US 1999-435977	A	19991108		
AB	The measuring range of a <b>fuel cell</b> based concentration <b>sensor</b> can be extended by decreasing the load across the <b>fuel cell</b> terminals and by increasing the amount of oxidant supplied to the <b>fuel cell</b> . In this way, such a <b>sensor</b> avoids saturation, for example, when measuring <b>methanol concns.</b> from 0M to over 4M in liquid aqueous solution. Such a <b>sensor</b> is suitable for use in measuring fuel concns. in the recirculating fuel stream of certain <b>fuel cell</b> stacks (for example, direct <b>methanol fuel cell</b> stacks).				
ST	<b>fuel cell methanol concn</b>				
	<b>sensor</b>				
IT	Catalysts				
	(electrocatalysts; <b>fuel cell (methanol)</b>				
	<b>sensor</b> with small load resistance and high oxidant supply)				
IT	Polyoxyalkylenes, uses				
	RL: DEV (Device component use); USES (Uses)				
	(fluorine- and sulfo-containing, ionomers; <b>fuel cell (methanol) sensor</b> with small load resistance and high oxidant supply)				
IT	<b>Fuel cells</b>				
	<b>Sensors</b>				
	(fuel cell (methanol) <b>sensor</b>				
	with small load resistance and high oxidant supply)				
IT	Alcohols, uses				
	Aldehydes, uses				
	Esters, uses				
	Ethers, uses				
	RL: TEM (Technical or engineered material use); USES (Uses)				
	(fuel cell (methanol) <b>sensor</b>				
	with small load resistance and high oxidant supply)				
IT	Carbon fibers, uses				

RL: TEM (Technical or engineered material use); USES (Uses)  
(paper, substrate; **fuel cell (methanol)**  
**sensor** with small load resistance and high oxidant supply)

IT Fluoropolymers, uses  
RL: DEV (Device component use); USES (Uses)  
(polyoxyalkylene-, sulfo-containing, ionomers; **fuel cell**  
**(methanol) sensor** with small load resistance and  
high oxidant supply)

IT Ionomers  
RL: DEV (Device component use); USES (Uses)  
(polyoxyalkylenes, fluorine- and sulfo-containing; **fuel**  
**cell (methanol) sensor** with small load  
resistance and high oxidant supply)

IT 67-56-1, **Methanol**, uses  
RL: ANT (Analyte); TEM (Technical or engineered material use); ANST  
(Analytical study); USES (Uses)  
(**fuel cell (methanol) sensor**  
with small load resistance and high oxidant supply)

IT 7440-06-4, Platinum, uses 12779-05-4  
RL: CAT (Catalyst use); USES (Uses)  
(**fuel cell (methanol) sensor**  
with small load resistance and high oxidant supply)

IT 7782-42-5, Graphite, uses 66796-30-3, Nafion 117  
RL: DEV (Device component use); USES (Uses)  
(**fuel cell (methanol) sensor**  
with small load resistance and high oxidant supply)

IT 64-17-5, Ethanol, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(**fuel cell (methanol) sensor**  
with small load resistance and high oxidant supply)

RE.CNT 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS RECORD  
RE

(1) Barton, S; J ELECTROCHEM SOC; JOURNAL OF THE ELECTROCHEMICAL SOCIETY 1998,  
V145(11), P3783 CAPLUS

(2) Criddle, W; SELECTIVE ELECTRODE REVIEWS 1992, V14(2), P195 CAPLUS.

(3) Hong, Y; SENSORS AND ACTUATORS B 1996, VB32(1), P7 CAPLUS

(4) Kumagai, T; US 4810597 A 1989

(5) Luft, G; US 5624538 A 1997 CAPLUS

(6) Oetjen, H; WO 0046869 A 2000 CAPLUS

(7) Tantram, A; US 4132616 A 1979 CAPLUS

(8) Wolfe, W; US 3852169 A 1974 CAPLUS

L20 ANSWER 25 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN  
AN 2001-245951 [26] WPIX  
DNN N2001-175048 DNC C2001-074131  
TI Determining fuel concentration in electrolyte of fuel cell comprises  
measuring capacity of capacitor, calculating dielectric constant and  
determining fuel concentration.

DC E17 J04 S01 S03 X16  
IN FRANK, M  
PA (SIEI) SIEMENS AG; (FRAN-I) FRANK M  
CYC 23

PI DE 19938790 A1 20010222 (200126)\* 3p H01M008-04  
 WO 2001013451 A1 20010222 (200126) DE H01M008-04  
 RW: AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE  
 W: CA CN JP US  
 EP 1206808 A1 20020522 (200241) DE H01M008-04  
 R: AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE  
 US 2002109511 A1 20020815 (200256) G01R027-26  
 JP 2003507859 W 20030225 (200317) 11p H01M008-04  
 ADT DE 19938790 A1 DE 1999-19938790 19990816; WO 2001013451 A1 WO 2000-DE2771  
 20000816; EP 1206808 A1 EP 2000-962223 20000816, WO 2000-DE2771 20000816;  
 US 2002109511 A1 Cont of WO 2000-DE2771 20000816, US 2002-78123 20020219;  
 JP 2003507859 W WO 2000-DE2771 20000816, JP 2001-517449 20000816  
 FDT EP 1206808 A1 Based on WO 2001013451; JP 2003507859 W Based on WO  
 2001013451  
 PRAI DE 1999-19938790 19990816  
 IC ICM G01R027-26; H01M008-04  
 ICS G01N027-22  
 AB DE 19938790 A UPAB: 20010515  
 NOVELTY - Determining the fuel concentration in the electrolyte of a  
**fuel cell** operated with liquid fuel comprises measuring  
 the capacity of a capacitor using the fuel/electrolyte mixture as  
 dielectric, calculating the dielectric constant of the mixture and  
 determining the fuel concentration.  
 DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for a  
 device for carrying out the process comprising a capacitor through which  
 the fuel/electrolyte mixture flows, and devices for measuring the  
 capacity, calculating the dielectric constant and determining the fuel  
 concentration.  
 Preferred Features: The capacity is measured at a frequency of more  
 than 20 kHz. The fuel/electrolyte mixture is a **methanol**/water  
 mixture. The capacitor is a plate capacitor. A reference capacitor with a  
 dielectric in the theoretical concentration region is additionally used.  
 USE - For determining the **concentration** of **methanol**  
 in the electrolyte of direct **methanol fuel**  
**cells**.  
 ADVANTAGE - The process is simple and can be integrated into a closed  
**regulating** cycle.  
 Dwg.0/0  
 FS CPI EPI  
 FA AB; DCN  
 MC CPI: E10-E04L1; E11-Q03F; J04-C03  
 EPI: S01-D05A; S03-E02C; X16-C09; X16-H02  
 L20 ANSWER 26 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN  
 AN 2001:651990 CAPLUS  
 DN 136:88274  
 TI Plasma polymerized barrier films on membranes for direct **methanol**  
**fuel cells**  
 AU Feichtinger, J.; Galm, R.; Walker, M.; Baumgartner, K.-M.; Schulz, A.;  
 Rauchle, E.; Schumacher, U.  
 CS Institut fur Plasmaforschung der Universitat Stuttgart, Stuttgart,  
 D-70569, Germany

- SO Surface and Coatings Technology (2001), 142-144, 181-186  
CODEN: SCTEEJ; ISSN: 0257-8972
- PB Elsevier Science S.A.
- DT Journal
- LA English
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 42
- AB **Methanol** permeation through Nafion-type membranes suitable for use in a direct **methanol fuel cell** was investigated at different **concns.** of **methanol** in aqueous solns. Thin plasma polymerized barrier films were deposited on Nafion membranes in a low-pressure microwave-generated plasma to reduce their **methanol** permeability. Hydrocarbon coatings were produced by plasma deposition of a hexane-H<sub>2</sub> plasma; fluorocarbon coatings were produced from a tetrafluoroethane plasma. **Methanol** permeability was measured as a function of time using a gas chromatograph with a flame ionization **detector**. A plasma polymer layer with a thickness of approx. 0.27  $\mu\text{m}$  on Nafion 117 membrane reduced the permeability to **methanol** by a factor of .apprx.20.
- ST plasma polyimd barrier film **methanol fuel cell**  
; permeability **methanol fuel cell** plasma coating; vapor deposition permeability coating **methanol fuel cell**
- IT Hydrocarbons, uses  
RL: CPS (Chemical process); DEV (Device component use); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process); USES (Uses)  
(coating, plasma-induced; plasma-polymerized deposition of low-permeability coatings for **methanol** in direct-**methanol fuel cells**)
- IT Polyoxyalkylenes, uses  
RL: DEV (Device component use); PRP (Properties); USES (Uses)  
(fluorine- and sulfo-containing, ionomers, membranes; plasma-polymerized deposition of low-permeability coatings for **methanol** in direct-**methanol fuel cells**)
- IT Hydrocarbons, uses  
RL: CPS (Chemical process); DEV (Device component use); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process); USES (Uses)  
(fluoro, coating, plasma-induced; plasma-polymerized deposition of low-permeability coatings for **methanol** in direct-**methanol fuel cells**)
- IT **Fuel cells**  
(**methanol**-fed; plasma-polymerized deposition of low-permeability coatings for **methanol** in direct-**methanol fuel cells**)
- IT **Fuel cell** separators  
Membranes, nonbiological  
(**methanol**-permeable; plasma-polymerized deposition of low-permeability coatings for **methanol** in direct-**methanol fuel cells**)
- IT Permeability

- (of **methanol**; plasma-polymerized deposition of low-permeability coatings for **methanol** in direct-**methanol fuel cells**)
- IT Vapor deposition process  
(plasma; plasma-polymerized deposition of low-permeability coatings for **methanol** in direct-**methanol fuel cells**)
- IT Fluoropolymers, uses  
RL: DEV (Device component use); PRP (Properties); USES (Uses)  
(polyoxyalkylene-, sulfo-containing, ionomers, membranes; plasma-polymerized deposition of low-permeability coatings for **methanol** in direct-**methanol fuel cells**)
- IT Ionomers  
RL: DEV (Device component use); PRP (Properties); USES (Uses)  
(polyoxyalkylenes, fluorine- and sulfo-containing, membranes; plasma-polymerized deposition of low-permeability coatings for **methanol** in direct-**methanol fuel cells**)
- IT 67-56-1, **Methanol**, uses  
RL: DEV (Device component use); PRP (Properties); RCT (Reactant); RACT (Reactant or reagent); USES (Uses)  
(fuel; plasma-polymerized deposition of low-permeability coatings for **methanol** in direct-**methanol fuel cells**)
- IT 66796-30-3, Nafion 117  
RL: DEV (Device component use); PRP (Properties); USES (Uses)  
(membrane; plasma-polymerized deposition of low-permeability coatings for **methanol** in direct-**methanol fuel cells**)
- IT 110-54-3, Hexane, reactions 29759-38-4, Tetrafluoroethane  
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PYP (Physical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent)  
(plasma reactions of; plasma-polymerized deposition of low-permeability coatings for **methanol** in direct-**methanol fuel cells**)
- IT 1333-74-0, Hydrogen, reactions  
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PYP (Physical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent)  
(plasma-induced hexane reactions of; plasma-polymerized deposition of low-permeability coatings for **methanol** in direct-**methanol fuel cells**)
- RE.CNT 13 THERE ARE 13 CITED REFERENCES AVAILABLE FOR THIS RECORD  
RE  
(1) Anon; DE 19503205 C1 1995 CAPLUS  
(2) Baddour, R; J Appl Polym Sci 1964, V8, P897 CAPLUS  
(3) Comyn, J; Polymer Permeability 1988  
(4) DuPont; Nafion Perfluorinated Membranes; Technical Information 1993  
(5) Fowkes, F; Contact Angle, Wettability and Adhesion 1964  
(6) Kaelble, D; Physical Chemistry of Adhesion 1971  
(7) Kaiser, M; Surf Coat Technol 1999, V116/119, P552

- (8) Pu, C; J Electrochem Soc 1995, V142(7), P119
- (9) Ren, X; Electrochem Soc 1995, V95(23), P284
- (10) Walker, M; Acta Polym 1996, V47, P466
- (11) Walker, M; Doctoral Thesis, Universitat Stuttgart 1996
- (12) Walker, M; J Appl Polym Sci 1997, V64, P717 CAPLUS
- (13) Walker, M; Surf Coat Technol 1999, V116/119, P996

L20 ANSWER 27 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN DUPLICATE 5

AN 2000:119554 CAPLUS

DN 132:139773

TI Design and operation of an electrochemical **methanol**  
**concentration sensor** for direct **methanol**  
**fuel cell** systems

AU Narayanan, S. R.; Valdez, T. I.; Chun, W.

CS Jet Propulsion Laboratory, California Institute of Technology, Pasadena,  
CA, 91109, USA

SO Electrochemical and Solid-State Letters (2000), 3(3), 117-120  
CODEN: ESLEF6; ISSN: 1099-0062

PB Electrochemical Society

DT Journal

LA English

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 76

AB The design and operation of a **methanol concentration**  
**sensor** suitable for use with direct **methanol**  
**fuel cells** is described. The sensing principle is based  
on the measurement of concentration-dependent oxidation currents for the  
electro-oxidation of **methanol** in a polymer electrolyte membrane  
cell at a platinum-ruthenium electrode. The device construction and  
properties are described. The **sensor** was integrated with an  
automatic fuel feed system, and was operated for several tens of hours.  
The results demonstrate that the **sensor** is robust and sensitive  
enough to meet the demands of **concentration** sensing and control in  
direct **methanol fuel cell** systems.

ST electrochem **methanol concn sensor**  
**fuel cell**

IT **Fuel cells**  
(design and operation of electrochem. **methanol concn**  
. **sensor** for direct **methanol fuel**  
cell systems)

IT **Sensors**  
(electrochem.; design and operation of electrochem. **methanol**  
**concentration sensor** for direct **methanol**  
**fuel cell** systems)

RE.CNT 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS RECORD  
RE

- (1) Calabrese Barton, S; J Electrochem Soc 1998, V145, P3783
- (2) Kosek, J; 1998 Fuel Cell Seminar Abstracts 1998, P693
- (3) Narayanan, S; 1998 Fuel Cell Seminar Abstracts 1998, P707
- (4) Narayanan, S; Proceedings of the 38th Power Sources Conference 1998, P461  
CAPLUS
- (5) Narayanan, S; Proton Conducting Fuel Cells I, The Electrochemical Society

- Proceedings Series 1995, PV 95-23, P261
- (6) Narayanan, S; Proton Conducting Fuel Cells I, The Electrochemical Society Proceedings Series 1995, PV 95-23, P278
- (7) Ren, X; J Electrochem Soc 1996, V143, PL12 CAPLUS
- (8) Surampudi, S; J Power Sources 1994, V47, P377 CAPLUS
- (9) Valdez, T; Proton Conducting Fuel Cells II, The Electrochemical Society Proceedings Series 1998, PV 98-27, P380
- (10) Zelenay, P; Proton Conducting Fuel Cells II, The Electrochemical Society Proceedings Series 1998, PV 98-27, P300

L20 ANSWER 28 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN DUPLICATE 6

AN 1998:685105 CAPLUS

DN 129:304377

TI **Methanol concentration sensor** for aqueous environments such as liquid direct-feed **fuel cells**.

IN Narayanan, Sekharipuram R.; Chun, William; Valdez, Thomas I.

PA California Institute of Technology, USA

SO PC'r Int. Appl., 32 pp.

CODEN: PIXXD2

DT Patent

LA English

IC ICM G01N027-406

CC 51-3 (Fossil Fuels, Derivatives, and Related Products)

Section cross-reference(s): 52, 80

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 9845694	A1	19981015	WO 1998-US7244	19980407
	W:	AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, GW, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM			
	RW:	GH, GM, KE, LS, MW, SD, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG			
	US 6306285	B1	20011023	US 1998-56054	19980406
	AU 9868981	A1	19981030	AU 1998-68981	19980407
	EP 1018000	A1	20000712	EP 1998-914680	19980407
	R:	DE, GB			
PRAI	US 1997-41872P	P	19970408		
	US 1998-56054	A	19980406		
	WO 1998-US7244	W	19980407		

AB An analyte concentration **sensor** that is capable of fast and reliable sensing of analyte concentration in aqueous environments with high concns. of the

analyte. Preferably, the present invention is a **methanol concentration sensor** device coupled to a fuel metering control system for use in a liquid direct-feed **fuel cell**.

ST **methanol** detn water **fuel cell sensor**

IT Plastics, uses

RL: DEV (Device component use); USES (Uses)

(conductive or metalized; **methanol concentration sensor** for aqueous environments such as liquid direct-feed fuel cells.)

IT **Fuel cells**

(liquid direct-feed; **methanol concentration sensor** for aqueous environments such as liquid direct-feed fuel cells.)

IT **Process control**

(**methanol concentration sensor** for aqueous environments such as liquid direct-feed fuel cells.)

IT **Ethers, uses**

RL: ARG (Analytical reagent use); ANST (Analytical study); USES (Uses)  
(**methanol concentration sensor** for aqueous environments such as liquid direct-feed fuel cells.)

IT 7732-18-5, Water, analysis

RL: AMX (Analytical matrix); ANST (Analytical study)  
(**methanol concentration sensor** for aqueous environments such as liquid direct-feed fuel cells.)

IT 67-56-1, **Methanol**, analysis

RL: ANT (Analyte); ANST (Analytical study)  
(**methanol concentration sensor** for aqueous environments such as liquid direct-feed fuel cells.)

IT 50-00-0, Formaldehyde, uses 64-17-5, Ethanol, uses 64-18-6, Formic acid, uses 64-19-7, Acetic acid, uses 75-07-0, Acetaldehyde, uses 109-87-5, Dimethoxymethane 110-00-9D, Furan, derivs. 110-88-3, Trioxane, uses 149-73-5, Trimethoxymethane 616-38-6, Dimethyl carbonate

RL: ARG (Analytical reagent use); ANST (Analytical study); USES (Uses)  
(**methanol concentration sensor** for aqueous environments such as liquid direct-feed fuel cells.)

IT 7440-06-4, Platinum, uses 7440-32-6, Titanium, uses 7440-57-5, Gold, uses 7782-42-5, Graphite, uses 12597-68-1, Stainless steel, uses 25583-20-4, Titanium nitride

RL: DEV (Device component use); USES (Uses)  
(**methanol concentration sensor** for aqueous environments such as liquid direct-feed fuel cells.)

RE.CNT 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS RECORD  
RE

- (1) Buzza; US 4003705 A 1977 CAPLUS
- (2) Holden; US 3410780 A 1968 CAPLUS
- (3) La Conti; US 4025412 A 1977 CAPLUS
- (4) MC Elroy; US 5118398 A 1992 CAPLUS
- (5) Meysson; US 3464008 A 1969
- (6) Neti; US 4575410 A 1986 CAPLUS
- (7) Razaq; US 5322602 A 1994 CAPLUS
- (8) Smith; US 3480520 A 1969 CAPLUS
- (9) Surampudi; US 5599638 A 1977 CAPLUS
- (10) Tomantschger; US 5173166 A 1992 CAPLUS

L20 ANSWER 29 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN

AN 1998-558669 [48] WPIX

DNN N1998-435585 DNC C1998-167355



TI New perovskite-type solid electrolyte - has alkaline earth metal sites occupied by barium and rare earth metal sites occupied by praseodymium and another rare earth metal.

DC L03 S03 X16

IN FUKUI, T; KAWATSU, S; OGAWA, M; OHARA, S

PA (NIFI-N) JAPAN FINE CERAMICS CENT; (TOYT) TOYOTA JIDOSHA KK; (AICI) AICHI SEIKO KK; (TOYX) TOYODA AUTOMATIC LOOM WORKS; (FINE-N) ZH FINE CERAMICS CENT

CYC 3

PI DE 19814106 A1 19981022 (199848)\* DE 62p H01M008-12  
JP 10284108 A 19981023 (199902) 41p H01M008-12  
CA 2232737 A 19980930 (199910) H01M008-02

ADT DE 19814106 A1 DE 1998-19814106 19980330; JP 10284108 A JP 1997-98072 19970331; CA 2232737 A CA 1998-2232737 19980319

PRAI JP 1997-98072 19970331

IC ICM H01M008-02; H01M008-12

ICS B01D057-02; C01B003-24; C01F017-00; G01N027-407; G01N027-409;  
H01B001-06; H01M008-06; H01M008-10; H01M008-24

AB DE 19814106 A UPAB: 19981210

A novel solid electrolyte has a perovskite structure which contains either (a) alkaline earth metal sites occupied by barium, rare earth metal sites occupied by praseodymium and another rare earth metal (preferably gadolinium or cerium and another rare earth metal, preferably gadolinium), and oxygen; or (b) alkaline earth metal sites occupied by barium and another alkaline earth metal (preferably magnesium or calcium), rare earth metal sites occupied by cerium and another rare earth metal (preferably gadolinium or praseodymium and another rare earth metal, preferably gadolinium), and oxygen. Also claimed are (i) solid ceramic **fuel cells**, direct **methanol fuel cells**, hydrogen pumps, oxygen **concentration sensors**, vapour **concentration sensors** and **fuel cell** systems containing the above solid electrolyte; (ii) a direct **methanol fuel cell** including a proton conductive solid electrolyte formed by sintering a mixture of metal compounds, at least one of which is a metal oxide; and (iii) hydrogen separation and supply equipment which has a hydrogen pump including the above solid electrolyte.

USE - For **fuel cells**, hydrogen pumps and oxygen and vapour **concentration sensors**.

ADVANTAGE - The solid electrolyte has excellent proton and oxygen ion conductivity and can be used at lower temperatures (e.g. 400-700 deg. C) than conventional solid electrolytes so that special heat resistant materials are not required for e.g. **fuel cell** construction.

Dwg.11/28

FS CPI EPI

FA AB; GI

MC CPI: L03-E04A

EPI: S03-E03C; X16-C01A; X16-J01C

L20 ANSWER 30 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

AN 1997:505246 CAPLUS

DN 127:193067

TI Manufacture of noble metal catalysts, apparatus for reducing carbon monoxide **concentration**, apparatus for reducing **methanol concentration**, and fuel reformers

IN Aoyama, Satoshi

PA Toyota Motor Corp., Japan

SO Jpn. Kokai Tokkyo Koho, 15 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM H01M008-06

ICS H01M008-06; B01J023-38; B01J023-46; C01B003-40; C01B003-58

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 09199156	A2	19970731	JP 1996-28662	19960122
PRAI	JP 1996-28662		19960122		

AB The catalysts are prepared by adsorbing noble metal salts on a support and reducing the salt in a H atmospheric, where temperature during the reduction is adjusted to

**regulate** the particle size of the noble metal on the support.

Particle size of Ru on Al<sub>2</sub>O<sub>3</sub> is **regulated** with 0.3-10 and 10-100

nm by adjusting the reduction temperature at 200-400 and 400-900°, resp.

Apparatus for reducing CO concentration in a H rich gas includes a means for supplying

an O containing oxidant gas to the H rich gas and a selective oxidation chamber containing a catalyst having 0.3-10 nm Ru particles loaded on a support.

Apparatus

for reducing MeOH concentration in a H rich gas, having MeOH concentration lower than H

concentration, includes a means for supplying an O containing oxidant gas the the H

rich gas and a selective oxidation chamber containing a catalyst having 10-100 nm

Ru particles loaded on a support. The reformers have a reforming section, means for **detecting** CO and/or MeOH concentration in the reformed gas, the above described CO and/or MeOH concentration reducing apparatus, and means controlling the oxidant gas supply of the apparatus depending on the monitored concns. The reformers are suitable for fuel cell power plants.

ST **fuel cell** reformed gas impurity removal; carbon monoxide removal reformed gas; **methanol** removal reformed gas; ruthenium catalyst manuf particle size control

IT **Fuel cells**

(particle size control in manufacture of ruthenium catalyst on alumina supports for carbon monoxide and **methanol** removal from reformed gas for **fuel cells**)

IT 1344-28-1, Alumina, uses 7440-18-8, Ruthenium, uses

RL: CAT (Catalyst use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)

(particle size control in manufacture of ruthenium catalyst on alumina supports for carbon monoxide and **methanol** removal from reformed gas for **fuel cells**)

IT 1333-74-0P, Hydrogen, preparation  
RL: PUR (Purification or recovery); PREP (Preparation)  
(particle size control in manufacture of ruthenium catalyst on alumina supports for carbon monoxide and **methanol** removal from reformed gas for **fuel cells**)

IT 67-56-1, **Methanol**, processes 630-08-0, Carbon monoxide, processes  
RL: REM (Removal or disposal); PROC (Process)  
(particle size control in manufacture of ruthenium catalyst on alumina supports for carbon monoxide and **methanol** removal from reformed gas for **fuel cells**)

L20 ANSWER 31 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN

AN 1997-004493 [01] WPIX

DNN N1997-004054 DNC C1997-001056

TI **Fuel cell** system - has reforming device to reform **methanol** to **fuel** gas containing hydrogen and **fuel cell** to obtain electromotive force by electrochemical reaction of fuel gas.

DC L03 S03 X16

PA (TOYT) TOYOTA JIDOSHA KK

CYC 1

PI JP 08273690 A 19961018 (199701)\* 32p H01M008-06

ADT JP 08273690 A JP 1995-100314 19950331

PRAI JP 1995-100314 19950331

IC ICM H01M008-06

ICS G01N027-416; H01M008-04

AB JP 08273690 A UPAB: 19970102

The **fuel cell** system has a reforming device to reform **methanol** to fuel gas containing H<sub>2</sub>, and the **fuel cell** to obtain electromotive force by electrochemical reaction of the fuel gas. The system is provided with a **methanol detecting** device, and an operation control device for the reforming device, to reduce **methanol concentration** according to the measured **methanol concentration**

ADVANTAGE - A **fuel cell** system which can prevent decreasing **fuel cell** output is provided with control of the reforming device to reduce **methanol concentration**

Dwg.3/27

FS CPI EPI

FA AB; GI

MC CPI: L03-E04

EPI: S03-E03; X16-C09; X16-C17

L20 ANSWER 32 OF 34 JICST-EPlus COPYRIGHT 2003 JST on STN

AN 900232940 JICST-EPlus

TI Study on fuel supplying method and **methanol concentration sensor** for the high efficient operation of **methanol fuel cells**.

AU TSUKUI TSUTOMU; DOI RYOTA; YASUKAWA SABURO; KURODA OSAMU

CS Hitachi, Ltd.

SO Denki Gakkai Ronbunshi. B (Transactions of the Institute of Electrical

Engineers of Japan. B), (1990) vol. 110, no. 1, pp. 67-76. Journal Code: S0809A (Fig. 17, Tbl. 1, Ref. 6)  
ISSN: 0385-4213

CY Japan

DT Journal; Article

LA Japanese

STA New

AB Demands for the the application of **fuel cells** to home appliances and industrial equipments have been increasing because of their long life and continuous electricity. A **methanol fuel cell** is so handy that it is profitable use. It is most important for **fuel cells** to operate them with higher efficiency. A fuel supplying system which could operate the **methanol fuel cell** with higher efficiency was studied in the paper. Since the consumption ratio of water and **methanol** in the cell varied with operating conditions, the system which **methanol** and water, were supplied independently from tanks in the circulating system of anordic electrolyte was adopted firstly. Then, the amounts of **methanol** and water supply were controlled by **methanol concentration uid level sensors**. The **methanol concentration sensor** based on electrochemical reaction under constant voltage could accurately **detect methanol concentration** in the range of 0.4-1.5mol/l. On the other hand, the liquid level **sensors** were based on the principle that short circuit current flowed while they were immersed in anordic electrolyte, and were arranged at the upper, middle and bottom of the liquid level. As the result of operating the **methanol fuel cell** with this **fuel** supplying system, high efficient and stable characteristics of the cell within the variation of  $\pm 0.1\text{mol/l}$  of specified of **methanol concentration** could be obtained.  
(author abst.)

CC YB04040V (621.352.6)

CT liquid fuel cell; chemical **sensor**; concentration determination; energy conversion efficiency; fuel system apparatus; aliphatic alcohol

BT fuel cell; chemical cell; battery; **sensor**; instrumentation element; measurement; efficiency; alcohol; hydroxy compound

L20 ANSWER 33 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN

AN 1985-231429 [38] WPIX

DNN N1985-173409 DNC C1985-100391

TI Fuel concentration control method - and electrode material for recirculating **methanol-air fuel cell**.

DC L03 X16

IN HITACHIOH, I; HORIBA, T; IWAMOTO, K; KAMO, T; KITAMI, K; KUMAGAI, T; TAKEUCHI, S; TAMURA, K

PA (HITA) HITACHI LTD

CYC 4

PI	DE 3508153	A	19850912 (198538)*	27p
	GB 2157478	A	19851023 (198543)	
	JP 60189174	A	19850926 (198545)	
	GB 2157478	B	19870423 (198716)	
	DE 3508153	C	19870716 (198728)	

US 4810597 A 19890307 (198912)

JP 03074468 B 19911127 (199151)

ADT DE 3508153 A DE 1985-3508153 19850307; GB 2157478 A GB 1985-55715  
19850306; JP 60189174 A JP 1984-42081 19840307; GB 2157478 B GB 1985-5715  
19850306; US 4810597 A US 1985-709204 19850307; JP 03074468 B JP  
1984-42081 19840307

PRAI JP 1984-42081 19840307

IC H01M008-04

AB DE 3508153 A UPAB: 19930925

A liquid fuel electrical cell consisting of a fuel-electrode and an oxidant-electrode uses a recirculating mixture of **methanol** and sulphuric acid in water. The cell performance is improved by using a separate cell to react to the fuel-concentration and using this **signal** to **regulate** the supply of additional fuel/water mixture, so as to maintain a constant concentration Figure 1 shows an

arrangement

of fuel tank (13) and acid tank (11) with **regulator** (10) and parallel bank of **fuel cells** (8). The sensing element used in the **regulator** is another **fuel-cell**.

Figure 2 shows a **regulator** circuit with feedback to the fuel admixture valve. The recirculating fuel (16) flows past the fuel electrode which is separated by an electrolyte in a membrane from oxidant-electrode (2) which has a flow of air directed at its other surface. The cell-voltage is **detected** by (17) and converted to a valve-control **signal** by (18) operating via (21) on valve (19). In another construction the electrolyte between the electrodes 1 and 2 is the fuel-mixture itself.

2/2

FS CPI EPI

FA AB

MC CPI: L03-E04

EPI: X16-C; X16-E01

L20 ANSWER 34 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

AN 1982:9438 CAPLUS

DN 96:9438

TI Fuel concentration **sensors** for fuel cells

PA Nissan Motor Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 4 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC H01M008-04

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 56118273	A2	19810917	JP 1980-20017	19800220
PRAI	JP 1980-20017		19800220		

AB A temperature-compensated **sensor** located in the fuel line of an air-fuel (MeOH) fuel cell consists of a fuel electrode, a fuel chamber, a thermistor, a membrane, an air electrode, an air chamber having an

air-fuel supply tube, and a temperature compensation package. The composition of the

air-fuel supply to the **sensor** is kept constant, and the concentration difference between this supply and the fuel supply for the fuel cell generates a monitoring **signal**.

ST fuel cell concn **sensor**

IT **Fuel cells**

(methanol-air, fuel concentration sensor  
for)

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